

## REDESIGNING DEVELOPMENTAL MATH THINGS YOU OUGHT TO CONSIDER

A number of innovative ideas emerged from NCAT's collaboration with the Tennessee Board of Regents (TBR) in its [Developmental Studies Redesign Initiative](#) for you to consider as you redesign.

Since the early 1980's, the TBR has operated a remedial and developmental math program comprising three courses taught primarily in traditional classroom settings in a 16-week format. The delivery strategy for courses offers a gradation of "basic remedial" (Basic Math), "basic developmental" (Elementary Algebra), and "intermediate developmental" (Intermediate Algebra). The same three courses (remedial and developmental) are offered at all of its 13 community colleges and the same two of those courses (developmental only) are offered at its six universities, helping to ensure a consistent experience for all TBR students regardless of location.

The TBR program also uses a uniform placement testing system. Students are placed in a remedial or developmental course if their ACT/Compass math subject scores are less than 19 or 29 respectively. Using ACT as an example, if students score 17 or 18, they are placed in Intermediate Algebra; if students score 15 or 16, they are placed in Elementary Algebra; if students score 14 or less, they are placed in Basic Math. Students are required to progress through one, two or three courses on a semester schedule until they exit Intermediate Algebra. Only then can they enroll in college-level math courses or their desired programs of study.

Three TBR institutions redesigned their remedial/developmental math programs with outstanding results. An overarching goal of each redesign was to streamline the amount of time that students--traditional and non-traditional aged--devote to remedial and/or developmental studies. That goal was achieved in each case by making many changes based on proven methods of integrating technology and learner-centered pedagogy. In addition, a number of new innovative ideas emerged that are described below.

### **1. Are you absolutely certain that the content of your remedial/developmental courses is NOT college-level?**

When [Jackson State Community College \(JSCC\)](#) redesigned the three remedial and developmental math courses, they replaced them with 12 clearly defined modules mapped to the competencies originally required in the three courses. Courses were divided as follows: Modules 1, 2 and 3 for Basic Math; Modules 4, 5, 6 and 7 for Elementary Algebra and Modules 8, 9, 10, 11 and 12 for Intermediate Algebra.

After the first full year of implementation of their redesign JSCC mapped their competencies to ACT's College Readiness Standards by score range. ACT defines "readiness" for college-level math at a score of 22 and above. JSCC discovered that Modules 1 – 3 (Basic Math) mapped appropriately to the score range 16 – 19. They also discovered that 11 of the 20 competencies included in Modules 4 – 7 (Elementary Algebra) mapped appropriately to the score range 16 – 23 but that 9 of the

competencies mapped to the score range 24 – 32 (i.e., were college-level competencies rather than developmental, according to ACT.) They also discovered that all but one of the 22 competencies included in Modules 8 – 12 (Intermediate Algebra) mapped to the score range 24 – 32 (i.e., were college-level competencies rather than developmental, according to ACT.)

This means that students in developmental math (e.g., with an ACT score of 17 or 18) are, in essence, being held to a higher standard than students who are not in developmental math (e.g., with an ACT score of 19 or 20). This insight is leading JSCC and other TBR institutions to re-consider what is developmental vs. college-level course content.

***For your consideration:*** Have you examined whether or not you are teaching college-level math in your remedial/developmental courses and, if so, how much? Are you unnecessarily prolonging the student experience by doing so?

## **2. Are you remediating high school deficiencies in your remedial/developmental courses or preparing students to succeed in college?**

ACT studies show that 80 - 90% of students need an assortment of skills from Basic Math, Elementary Algebra, Geometry and Statistics to succeed in college-level math courses, and they do not need as much Algebra as the traditional remediation approach provides.

Jackson State Community College (JSCC) recognized that student goals are different: they may plan to enter a program of study that requires advanced mathematics, to complete a general education mathematics course or to apply for admission to a nursing or allied health program. Consequently, JSCC's redesign moved away from remediating students' high school algebra deficiencies to preparing students for their particular educational goals. Students were required to master only the concept deficiencies that were relevant to their educational and career goals.

After defining the competencies to be included in each of the 12 modules, the math faculty determined which modules were necessary to succeed in each college-level general education math course. All other departments identified which modules were necessary to succeed in their college-level courses as well as their discipline's core math requirements. Departments with programs not requiring college-level math determined the modules necessary to succeed in those programs. Changes in developmental math prerequisites were approved by the college curriculum committee.

Of the 48 programs of study at JSCC requiring college-level math courses, 35 required only seven modules (47.1% of the students); four required eight modules (31.2% of the students), and seven required all 12 modules (20.3% of the students). One program required only six modules (0.8% of the students), and one required only four modules (0.6% of the students).

Students were advised of their multi-exit opportunities based on their program of study choice and of the need to take more modules if they later changed their majors. This was accomplished via information sheets for each major, focus-group sessions and individual counseling with math instructors and the students' academic advisors. The

team made a campus-wide presentation at an in-service training and conducted sessions for advisor training in order to educate the college faculty and staff.

By changing the requirements for developmental math completion, JSCC should be able to reduce the number of sections/modules they needed to offer by 31%. As an example, during the 2008-09 academic year, 1836 students were enrolled in developmental math. JSCC needed to offer the equivalent of 15,241 modules to serve these students under the new policy. Assuming similar placement distributions, JSCC would have had to offer 22,032 modules under the old policy.

**For your consideration:** Are you looking backward or forward? Are you remediating high school algebra deficiencies in your remedial/developmental courses or preparing students to succeed in college? Are you preparing all students to succeed in STEM majors, even though most will not major in a STEM field?

### **3. Are there simpler alternatives to complicated diagnostic assessments after placing student in remedial/developmental courses?**

When Jackson State Community College (JSCC) redesigned the three remedial and developmental math courses, they replaced them with 12 clearly defined modules mapped to the competencies originally required in the three courses.

JSCC experimented with module placement by ACT scores and by Compass scores. They found that over 95% of the students would have been placed above their deficient level if ACT or Compass placement were the only tool used. They concluded that while the ACT and Compass tests may be sufficient to determine whether or not a student is college-ready for mathematics, they are not appropriate diagnostic tools to determine mastery of specific competencies.

Consequently, JSCC developed their own diagnostic assessment using MyMathTest that corresponded to the competencies in the 12 modules. Of the 1067 new students tested in fall 2007 and spring 2008, only 3% of the students did not need to study the competencies in Modules 1 – 3 (Basic Math). Based on these results, JSCC decided that requiring students to take the additional diagnostic assessment was a waste of time since 97% of the students tested into Module 1.

Instead, JSCC now requires all students who place into remedial/developmental courses via ACT or Compass to start at Module 1 and take a pre-test. If the pre-test score is 80% or above, the student is deemed to have successfully completed the module and moves on to the next module, again taking a pre-test, and so on. A student scoring less than 80% on any given module completes the work required for that module and takes a post-test to complete the module. Now each student passes each module, proving mastery of each skill rather than a general level of competency as indicated by ACT/Compass scores.

**For your consideration:** Do you really need to administer diagnostic assessments beyond your initial placement test? Doesn't it make more sense to allow students to "challenge" each module by passing a test, moving quickly through early modules when possible, ensuring that each module competency has been mastered?

### **4. Is there a cost-effective way to offer low-enrollment sections?**

Every campus faces class times that historically have low enrollment numbers. Cleveland State Community College (CSCC) quickly realized that it is possible to offer multiple courses in the same classroom at the same time because the Emporium Model individualizes instruction for each student. Students progress through their courses individually, and instructors provide assistance to each student as needed. Multiple courses can be offered in either a large computer lab or in a small computer classroom.

Some campuses also face low enrollment in math courses at smaller branch campuses, which often means that those courses cannot be offered each term. This creates scheduling roadblocks for students and may prevent them from completing their degree requirements on time. Scheduling more than one course in the same classroom at the same time when enrollment in the courses is small has enabled CSCC's math department to increase course offerings at all campuses and meet students' program needs better than ever before. In essence, they are offering "math on demand."

Cleveland State calls this strategy "reinstating the one-room schoolhouse."

***For your consideration:*** Would the one-room schoolhouse strategy help solve scheduling problems on your campus and enable all students to take the courses they need to complete their programs on time?